

## CLAIMS:

1. A method for generating parametric output from a parametric loudspeaker system, comprising the steps of:
  - 5 retrieving a pre-encoded audio signal from an electronically readable storage medium, wherein an ultrasonic carrier signal having at least one sideband represents the pre-encoded audio signal; and
  - 10 playing back the pre-encoded audio signal through an ultrasonic amplifier and emitter.
- 15 2. A method as in claim 1, wherein step (b) further comprises the step of retrieving the pre-encoded audio signal which has been pre-processed.
3. A method as in claim 2, wherein step (b) further comprises the step of retrieving the pre-encoded audio signal which has been pre-processed with distortion error correction.
- 15 4. A method as in claim 1, further comprising the step of modulating the ultrasonic carrier signal with the audio signal to produce the pre-encoded audio signal.
5. A method as in claim 1, further comprising the step of retrieving the pre-encoded audio signal from an optical storage medium with ultrasonic bandwidth.
- 20 6. A method as in claim 1, further comprising the step of retrieving a processed audio signal from a magnetic storage medium with ultrasonic bandwidth.
7. A method as defined in claim 1, comprising of the further steps of:
  - 15 positioning the parametric loudspeaker system with a projection orientation toward an intended listening area; and
  - 25 playing back the pre-encoded audio signal in a region substantially limited to the intended listening area.
8. A method for storing parametric output for later playback from a parametric loudspeaker system, comprising the steps of:
  - 30 modulating the ultrasonic carrier with the audio signal to create at least one sideband which represents the audio signal and produces a processed signal; and
  - storing the processed signal on an electronically readable storage medium.
9. A method as in claim 8, further comprising the step of applying distortion error correction to an audio signal to produce a processed signal.

10. A method as in claim 8, further comprising the step of playing back the processed signal from the electronically readable storage medium, through an ultrasonic amplifier and emitter.

5 11. A device for storing parametric audio signals for output through a parametric loudspeaker system, comprising:

an electronically readable storage medium; and

an ultrasonic carrier signal having at least one sideband which represents a pre-encoded audio signal, wherein said pre-encoded audio signal is stored on the electronically readable storage medium.

10 12. The device as in claim 11, further comprising:

a retrieval unit for retrieving a pre-encoded audio signal from an electronically readable storage medium that has ultrasonic bandwidth; and

a playback module for playing back the pre-encoded audio signal.

15 13. The device as in claim 12, wherein the playback module further comprises:

an amplifier, coupled to the retrieval unit, for amplifying the pre-encoded ultrasonic signal; and

an ultrasonic emitter, coupled to the amplifier, configured to emit ultrasonic waves that de-couple in the air to audible sounds.

20 14. The device as in claim 11, further comprising a recording module for recording the pre-encoded audio signals onto the electronically readable storage medium, the recording means comprising:

a modulator, configured to pre-encode an ultrasonic carrier signal with the audio signal to form a processed signal;

25 a write unit configured to write the processed signal to an electronically readable storage medium for replay by the parametric loudspeaker system.

15. The device as in claim 11, further comprising an error correction module to pre-distort the odulated signal and form a processed signal.

16. The device as in claim 15, further comprising a compression module to compress the modulated signal and form a compressed signal.

30 17. A method for storing pre-encoded signals for a parametric loudspeaker system, comprising the steps of:

receiving at least one audio sideband signal;  
modulating an ultrasonic carrier signal with the audio sideband signal to create at least one sideband which represents the audio signal and form a modulated signal;  
applying error correction to the modulated signal to form a processed signal;  
5 storing the processed signal on an electronically readable storage medium for replay by the parametric loudspeaker system.

18. A method as in claim 17, further comprising the step of storing the processed signal on an optical storage medium with an ultrasonic bandwidth.

10 19. A method as in claim 17, further comprising the step of storing the processed signal on a magnetic storage medium with an ultrasonic bandwidth.

20. A method as in claim 17, further comprising the step of storing the processed signal on a high bandwidth storage medium with an ultrasonic bandwidth.

15 21. A method as in claim 17, wherein the step of applying error correction further comprises the step of applying error correction to correct for distortion introduced in the parametric demodulation process in air.

22. A method for generating parametric output through a parametric loudspeaker system, comprising the steps of:

receiving an incoming audio signal;

20 modulating an ultrasonic carrier signal with the audio signal to create at least one sideband which represents the audio signal and to form a modulated signal;

applying error correction to the modulated signal to form a processed signal;

storing the processed signal on an electronically readable storage medium; and  
playing back the processed signal through an ultrasonic amplifier and emitter.

25 23. A method as in claim 22, further comprising the step of storing the processed audio signal on an optical storage medium with an ultrasonic bandwidth.

24. A method as in claim 22, further comprising the step of storing the processed audio signal on a Super Audio Compact Disk (CD)

25 25. A method as in claim 22, further comprising the step of storing the processed audio signal on a magnetic storage medium with an ultrasonic bandwidth.

30 26. A method as in claim 25, further comprising the step of storing the processed audio signal on a hard drive used as the magnetic storage medium.

27. A method as in claim 22, further comprising the step of playing back

the processed audio signal through an ultrasonic emitter having a film diaphragm.

28. A device for generating parametric output through a parametric loudspeaker system, comprising:

5 retrieval unit for retrieving a pre-encoded ultrasonic signal from an electronically readable storage medium that has ultrasonic bandwidth;

an amplifier, coupled to the retrieval unit, for amplifying the pre-encoded ultrasonic signal; and

10 an ultrasonic emitter, coupled to the amplifier, configured to emit ultrasonic waves that de-couple in the air to audible sounds.

29. A device to store pre-encoded signals for a parametric loudspeaker system, comprising:

15 an audio signal;

an modulator configured to modulate an ultrasonic carrier signal with the audio signal to create at least one sideband which represents the audio signal and to produce a modulated signal;

20 an error correction unit configured to pre-correct the modulated signal for demodulation distortion created by demodulation of parametric output in air;

an electronically readable storage medium, having an ultrasonic bandwidth, configured to store the pre-corrected, modulated signal.

25 30. A method for pre-encoding signals for a parametric loudspeaker system through a computer network, comprising the steps of:

receiving an incoming audio signal at a network processing node;

modulating an ultrasonic carrier signal with the audio signal to create at least one sideband which represents the audio signal and to form a modulated signal using the network processing node; and

25 30 returning the modulated signal through the computer network for replay by the parametric loudspeaker system.

31. A method as in claim 30, further comprising the step of applying error correction to the modulated signal to form a processed signal.

32. A method as in claim 31, further comprising the step of returning the processed signal through the computer network for storage on an electronically readable storage medium.

33. A method of inexpensively delivering information to a local listening area using parametric output from a parametric loudspeaker system, comprising the steps of:

5 retrieving a pre-encoded audio signal from an electronically readable storage medium, wherein the pre-encoded audio signal includes an ultrasonic carrier signal having at least one sideband to represent the audio signal;

playing back the pre-encoded audio signal through an ultrasonic amplifier and emitter to produce parametric output; and

directing the parametric output to a limited listening area.

10 34. A method as defined in claim 33, further comprising the steps of:

positioning the parametric loudspeaker system with a projection orientation toward the limited listening area; and

15 playing back the pre-encoded audio signal to a region of the limited listening area.

35. A method as defined in claim 33, wherein step (b) further comprises playing back the pre-encoded signal which includes an advertisement specific to a local display area.

36. A method as defined in claim 33, wherein step (b) further comprises playing back the pre-encoded signal which includes public announcement information specific to a local display area.

20 37. A method of inexpensively delivering information to a local listening area using parametric output from a parametric loudspeaker system to create a virtual speaker source, comprising the steps of:

25 retrieving a pre-encoded audio signal from an electronically readable storage medium, wherein the pre-encoded audio signal includes an ultrasonic carrier signal having at least one sideband to represent the audio signal;

playing back the pre-encoded audio signal through an ultrasonic amplifier and emitter to produce parametric output; and

30 directing the parametric output to a sound reflective surface which produces a virtual speaker source.

38. A device for storing parametric audio signals for output through a parametric loudspeaker system, comprising:

an electronically readable storage medium having an audible bandwidth storage capacity; and

a pre-distorted audio signal, having distortion error correction applied thereto, stored on the electronically readable storage medium.

5 39. A method for generating parametric output from a parametric loudspeaker system, comprising the steps of:

retrieving a pre-distorted audio signal from an electronically readable storage medium for storing an audible audio bandwidth;

10 modulating an ultrasonic carrier signal with the pre-distorted audio signal, to create at least one sideband, which represents an audio signal and produces a pre-encoded signal; and

15 playing back the pre-encoded audio signal through an ultrasonic amplifier and emitter.

40. A method as in claim 39, wherein the step of modulating further comprises the step of modulating the retrieved signal using a switching modulator before playback.

41. A method as in claim 39, wherein the switching modulator further comprises a phase shifter and a quadrature modulator.

42. A method for generating parametric output through a parametric loudspeaker system, comprising the steps of:

20 receiving an incoming audio signal;

applying error correction to the audio signal to form an error corrected signal;

25 storing the error corrected signal on an electronically readable storage medium having an audible bandwidth;

retrieving the error corrected signal from the electronically readable storage medium;

30 modulating an ultrasonic carrier signal with the error corrected signal to create at least one sideband which represents the audio signal and to form a modulated signal; and

playing back the modulated signal through an ultrasonic amplifier and emitter.

43. A device for storing parametric audio signals for output through a parametric loudspeaker system, comprising:

an electronically readable storage medium having an audible bandwidth storage capacity; and

5 a pre-distorted audio signal, having distortion error correction, ultrasonic modulation and signal compression applied thereto, stored on the electronically readable storage medium.

44. A device as in claim 43, wherein the signal compression compensates for spectrum expansion associated with ultrasonic modulation and allows the audio signal to be stored on the electronically readable storage medium.

10 45. A device as in claim 43, wherein the signal compression samples a modulated signal at twice an audio sampling frequency and stores alternate samples on two channels of the electronically readable storage medium.

46. A device as in claim 43, wherein the signal compression samples a modulated signal at 88.2kHz and stores alternating samples on two channels of a CD.

15 47. A device as in claim 43, wherein the signal compression is a lossy compression format.

48. A device as in claim 43, wherein the signal compression is a lossless compression format.

49. A method for generating parametric output from a parametric loudspeaker system, comprising the steps of:

20 retrieving a pre-processed audio signal from an electronically readable storage medium for storing an audible audio bandwidth, wherein the pre-processed audio signal has been distortion error corrected, modulated by an ultrasonic carrier, and compressed;

25 uncompressing the pre-processed audio signal; and

playing back the pre-encoded audio signal through an ultrasonic amplifier and emitter.

50. A method as in claim 49, further comprising the step of uncompressing the pre-processed audio signal that has been compressed to compensate for spectrum expansion associated with modulation by an ultrasonic carrier.

30 51. A method for generating parametric output through a parametric loudspeaker system, comprising the steps of:

receiving an incoming audio signal;

applying error correction, ultrasonic modulation, and compression to the audio signal to form an error corrected signal;

storing the error corrected signal on an electronically readable storage medium having an audible bandwidth;

5 retrieving the error corrected signal from the electronically readable storage medium; and

playing back the modulated signal through an ultrasonic amplifier and emitter.

It is to be understood that the above disclosure is not to be a basis of limiting scope of the future claims to be filed in connection with a non-provisional patent application which claims priority on this provisional filing; but represents subject matter from which the applicant intends to develop appropriate claim language in a formal patent application.